SCIENCE:

PUBLISHED BY N. D. C. HODGES, 874 BROADWAY, NEW YORK.

SUBSCRIPTIONS TO ANY PART OF THE WORLD, $3.50 A YEAR.

To any contributor, on request in advance, one hundred copies of the issue containing his article will be sent without charge. More copies will be supplied at about cost, also if ordered in advance. Reprints are not supplied, as for obvious reasons we desire to circulate as many copies of SCIENCE as possible. Authors are, however, at perfect liberty to have their articles reprinted elsewere. For illustrations, drawings in black and white suitable for photo-engraving should be supplied by the contributor. Rejected manuscripts will be returned to the authors only when the requisite amount of postage accompanies the manuscript. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guaranty of good faith. We do not hold ourselves responsible for any view or opinions expressed in the communications of our correspondents.

Attention is called to the "Wants" column. It is invaluable to those who use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

CURRENT NOTES ON CHEMISTRY.—II.

[Edited by Charles Platt, Ph. D., F. C. S.]

FLASH POINT OF MINERAL OILS.

WHILE not strictly chemical in its nature there are but few scientific tests so intimately connected with our safety as the determination of the flash and burning points of mineral oils. This has long been a matter of concern to oil merchants alone, but the scientific public is now taking an interest in the matter, which it is hoped will decrease, if not do away with altogether, the vast number of preventable lamp explosions and fatalities.

The safety of an oil is determined by its flash point, that temperature at which an explosion occurs when a flame is applied to the mixture of air and vapor immediately above the surface of the oil. A flash occurs, but the oil does not take fire and burn continuously, in the ordinary test cup, until a higher temperature is reached, its *burning* or *firing* point. Originally the test was applied to the oil in an open cup, but, this method introducing many chances of error, a closed cup was finally adopted, the flame being inserted through a hole in the cover. 100° F., formerly considered as the minimum safety point for oil, in the open cup corresponds to 73° F. in the closed test, and with the adoption of the latter, the British Government, advised by Sir Frederick Abel, lowered the minimum safety point required by law to this temperature! The reports and papers by Sir Frederick Abel and by Mr. Redwood, who was associated with him, contain many outrageous assertions, among others that an oil flashing at a low temperature is more safe than one flashing at a high temperature. They argued that by using the low-test oils a greater volume of vapor is given off and the air is thus driven from the lamp. A metal lamp was also recommended as the safest on this same principle, that by the heating of the oil in the lamp reservoir vapors are evolved from the oil, and the air being driven out as before, an inflammable, but not an explosive, mixture is obtained. When we consider that 73° F., adopted by the British Government, is a temperature frequently exceeded in our houses, the danger of such a ruling is apparent. Mr. D. R. Steuart presented an admirable paper to the Glasgow and Scottish Section of the Society of Chemical Industry, early last winter, in which the fallacies of Abel's position were forcibly shown. His paper was thoroughly discussed by the members at that meeting and subsequently, with the final result of an appointment of a committee of experts to pass upon the question. Their report fully sustained Mr. Steuart and recommended a higher flash point of minimum safety than that now established by law. Mr. Steuart's paper, presented at that time, and others of more recent date, contain many interesting facts relative to the burning of oils, as, for instance, the relation between flash point and heat developed in burning, the effect of the presence of heavy oils, of chemicals, etc., and of the size of the container.

A lamp burning badly develops more heat than usual, the light is red and the combustion imperfect, producing a disagreeable odor. This may arise from the air not being properly reverberated against the flame; or from the shape of the chimney allowing of back currents; or from the lamp being dirty, the air holes clogged, the wick damp or dirty; the presence of a trace of vegetable or animal oil in the vessels used for filling; or from the oil itself, the presence of heavy oils or refining chemicals. When the oils are not homogeneous, a light and heavy oil being mixed, the heat developed is greater than with either oil separately, this result being more pronounced when a poor wick is used. A well fractionated oil is practically independent of the wick. The treatment of the oil after the last distillation with acid and alkali, results in injury to it, no matter how thorough the final washing. Sulpho compounds of soda are often retained, and these decompose in the burner, forming sulphuric acid, which chars the wick. Carefully fractionated oils are low or high, in flash, in proportion to the specific gravity and boiling point. A low-flashing oil gives the highest temperature in burning. (Contrary to Abel and Redwood).

Another feature has been brought to our attention lately, that of the influence of the size of the containing vessel upon the danger point in oils. The Abel test, it will be remembered, is prescribed as a two-inch cup. A particular sample flashed in Abel test at 78° F.; in the old government open test at 105° F., and *fired* in the old government open test at 122° F. Although a small cup of this oil cannot supply vapor sufficient for a constant flame below 122° F., a larger surface can. The oil above mentioned, tested in an apparatus like the old government open, with a screen around and partly on top, but nine inches in diameter, applying the flame every two degrees, ignited explosively at 88° F. and continued to burn furiously. Applying the flame every degree the same result was attained at 87° F. Transforming the apparatus into a closed test, the oil ignited and burned at 76° F. Except, then, for small surfaces, the flash and burning points are the same, and the Abel flash, becomes a point of danger for oil in store, barrel or tin, while for oil in large vessels, tanks, etc., the danger point is still lower. A case is cited where a large tank of very high flashing oil was being pumped into, the temperature being far below the flash point in Abel cup, vapors were evolved, overflowing through an imperfectly closed manhole at the top, and were ignited at a lamp some distance below. The fire ran back; an explosion resulted, blowing off the top of the tank, and the oil was burned. It is curious to note that while the British Government fixes the flash test at 73° F. for the public, it places the same at 105° F. for its own governmental departments, and at 145° F. for the lighthouses.

EXTRACTION OF FAT FROM FEEDING CAKES.

The extraction of fat from fodder by means of anhydrous ether, after a preliminary drying, or even with low-boiling petroleum, is known to be unsatisfactory. To avoid the simultaneous extraction of coloring matters, resins, waxy impurities, etc., Dr. L. Gebek has conducted experiments, using burnt gypsum mixed with the substance to be extracted, also filtering the ethereal solution through a gypsum filter. Finely powdered gypsum be-